[Browne (S.S.)] A lay lecture on sanitary matters ... London, 1873.

SH
1873

Maggs 9/619

- 4 SEP 1962

LONDON · SCHOOL · OF · HYGIENE · AND · TROPICAL · MEDICINE ·

LIBRARY

Date 25.11.58

Class Mark b.SH 1873 Accession No. 50002

A

LAY LECTURE

ON

SANITARY MATTERS,

WITH A PAPER

ON SEWER VENTILATION.

BY

A Member of the Association for the Promotion
of Social Science.

LONDON:
KERBY AND ENDEAN, 190, OXFORD STREET,
1873.

"'A Lay Lecture on Sanitary Matters' is the title of a pamphlet by Mr. S. Sneade Brown, containing much valuable information and important suggestions. In a brief preface we are told 'this Lecture was prepared for the purpose of being given in the Schoolroom of St. John's Redland, but circumstances prevented its delivery. The several matters touched on in it, as affecting this locality, have for the most part, formed the subject of comment by the press or by public authorities, and in the belief that the attempt to communicate information on what ought to be of so much interest to all intelligent persons as the health of their neighbourhood, might interest some of the community, I have printed it for private circulation.' We can do no more than refer to the pamphlet at present."—*Bristol Paper*, 1871.

THIS Lecture was prepared for the purpose of being given in the Schoolroom of St. John's, Redland, but circumstances prevented its delivery. The several matters touched on in it, as affecting this locality, have for the most part formed the subject of comment by the Press or by Public Authorities, and, in the belief that the attempt to communicate information on what ought to be of so much interest to all intelligent persons as the health of their neighbourhood might interest some of the community, I have printed it for private circulation.

S. SNEADE BROWN.

PEMBROKE ROAD, CLIFTON, BRISTOL,
December, 1870.

Reprinted London, May, 1873.
13 Dorset Square N. W.

Digitized by the Internet Archive
in 2015

https://archive.org/details/b2440116x

I AM going to do a bold thing this evening. I propose, as a layman, to say a few words on what is usually regarded as a professional subject, namely, Health and Sanitary Matters; but I think I shall show before I close, that by following closely in the track and stepping in the footsteps of those who have gone before me, I may be able to communicate some useful information drawn from the storehouses of the authorities of the day, without trespassing beyond the limits justly set for unprofessional inquirers.

You must not expect me to enter on the subject of diseases at large. Milton has given a catalogue of some of them in the lines,

> "A lazarhouse it seemed, wherein were laid
> Numbers of all diseased, all maladies
> Of ghastly spasm, or racking torture, qualms
> Of heart-sick agony; all feverous kinds,
> Convulsions, epilepsy, colic pangs,
> Demoniac frenzy, moping melancholy,
> And moonstruck madness, pining atrophy,
> Marasmus, and wide-wasting pestilence."

It is only with the class of diseases known as "preventable diseases," that is to say, diseases bearing more directly on the Public Health, that a lay

Sanitarian could venture to meddle, and these have their teachings for all of us, extending over a wide variety of subjects. You have had the Social Science Association with you in the past year. Let me read you an extract from a Report of their Standing Committee in the year 1866. "The question of Public Health cannot be taken alone. It brings with it questions of religion, of morals, of worldly circumstances, of high or low tone of honour, of manners, of independence of feeling among at least the lowest ranks of our fellows. It is a fact that the conditions of locality, of lodging, of education and association, make, among the poorest, all the finer qualities of humanity nearly impossible. With court and alley dwellings, such as they are, all the benevolence and all the wise arrangements we are capable of will be little else than a vain and vexatious work. Change these conditions, as with adequate conscience and adequate money they may be changed, and have a wise and frequent visitation by good officers, under a sound local authority, who shall say what we might not arrive at, especially with the new Sanitary Act to help us? Through this question of Public Health, we get glimpses we never had before of our duty to our neighbour, and it unmistakably tells us who that neighbour is, and that his welfare is bound up with our welfare. As Carlyle says, 'They claim relationship by conveying to us in a fatal brotherly way their diseases and their mortality.' They will be relations, whether they are friends or not. In all this work of improving the condition of the lowest the golden sayings of Christianity are translated into actual deeds."

But diseases have other teachings as well. Dr. Gairdner, in his instructive work on "Public Health in relation to Air and Water" (Edinburgh, 1862,) observes, with reference to the cry of liberty of the subject in matters where the exercise of the so-called liberty endangers the lives and health of others, "certain forms of disease, and more especially those diseases which are commonly recognized as epidemic and endemic, can be viewed in no other light than as being Providential indications of a failure on the part of the individual, or of the community, to secure the great elements of health. I think we are bound, from what we know, to go this full length, that what is called epidemic disease, or pestilence, is not a necessary thing—it is a thing, which, by care and attention to the conditions of health, we get rid of to a great extent, if not entirely, by simple attention to the purity of air and water. I think therefore that I am, to a certain extent, justified by facts in assuming that we are to look upon the mere existence of these diseases, not perhaps, in every case, but certainly in the great majority of cases, as the evidence—plain and undeniable evidence—of a violated law—as the awful fact of God's providence, giving the seal of authority—of an authority higher than that of any earthly power—to a certain amount of interference with what, at first sight, seem to be private concerns, and to see that the causes of diseases are extinguished, as far as lies in our power."*

Far different were the opinions and practices of the earlier times. Epidemic disease was then supposed, to use the language of the same author, to be simply "a visitation of God, inscrutable, intangible, unassailable, borne on the wings of the wind, having no relation to diet, drink, habitation, or indeed any purely physical cause; while the prevention of the most destructive plagues was summed up in the one idea of fleeing from infection, and keeping the sick man or the sick nation, as far as possible out of the pale of humanity." "Fear, in truth, is the most selfish of the passions; it is the death or paralysis of all that is noble in humanity; and for many ages sanitary legislation was mainly founded on fear. It was not till the progress of science, and the increased comforts of living had diminished again the virulence of epidemic disease; and not even then until noble-minded philanthropists like John Howard had led the way anew in the path of reform, that the duty of mankind towards their fever-stricken brethren was distinctly recognized as being other than simply to let them die unseen.[*]

---

* Nothing is more striking than the serious tone which the first sanitary minds of the time appear, almost involuntarily, to adopt, in view of the power which the improved knowledge of the day confers over disease, a knowledge which Dr. Gairdner describes as having sprung into notice, in a broad and practical sense, little more than thirty years ago. Indeed Dr. G. quotes the opinion of a distinguished divine that the sanitary code of Mount Sinai ought to become the actual code of our modern cities, so strikingly superior is the Jewish ceremonial law, in a sanitary point of view, to everything that has since been devised or acted upon as a national system.

The principle that in this, as in other matters affecting the interests of the community, private rights must retire before the rights of the Public, needs to be kept in mind, as they are, not unfrequently, found to be in direct opposition. For instance, there may be two town wells, one a public, the other a private one, nearly side by side, both supplied with water apparently from the same sources and that water of objectionable quality. During an epidemical season the public well may be closed under the Diseases' Prevention Act, but the private one may not be touched. That one may diffuse its poison, as before, without let or hindrance. When the Cholera was in East London in 1866, and seven persons including the owner, had died in one small street from using the water of a private surface well surrounded by cesspools, the vestry authorities boldly carried off, at their own risk, the pump-handles of the other similarly situated private wells in the vicinity, in disregard of the remonstrances of the owners. It is not said whether any action at law followed, but there might have been one. It is to the insufficient recognition of this principle by the wealthy and influential that the late Sir Charles Hastings, M.D., ascribed much of the difficulty experienced in the adequate carrying out of many sanitary measures. (Social Science Transactions of 1864, p. 65.)

But these epidemic diseases, what are they? Dr. Farr answers this question in the 20th Annual Report of the Registrar-General: "We may conceive the different kinds of zymotic[†] matter distributed in clouds over the country, sometimes stretching over the whole atmosphere of the island, at other times brooding over isolated, but generally dense populations, in *unfavourable sanitary conditions;* Scarlatina found in one place, Small-Pox in another; Measles, Whooping Cough, Influenza, Typhus, Diarrhœa developed and prevailing, seldom simultaneously, but in recurring successions." Let us ask one more question. These world-wide diseases, which are thus permitted to issue forth from Nature's mysterious laboratory to plague mankind, can they be termed preventable? Mr. Simon, the medical officer of the Privy Council, answers the question for us in the General Board of Health's Report of 1858. He says, "The common infectious diseases of childhood —the diseases which occur to most persons once in life, cannot, during the present state of knowledge on the subject, be spoken of as products of local uncleanliness, or without exaggeration, have the word *preventable* applied to them in the sense to which it is applied to Typhoid fever, and of epidemic or endemic diarrhœal diseases. The former diseases, whenever called into existence (and among us, now, they never cease to exist) appear to have their distribution essentially determined by the intercourse of infected with susceptible persons. Crowding and imperfect ventilation, such as is common in the houses of the poor, and, as regards ventilation at least, by no means entirely absent from the houses even of the rich,* directly favours the process of contagion. Nothing is yet certainly known with respect to the primary source of measles, scarlatina, small-pox, and whooping cough. On analogy it is quite conceivable that they may have first arisen in the world from peculiar conditions of domestic filth, and that similar specific conditions may now from time to time originate new outbreaks. But these suppositions are not yet established as facts in science; and only in proportion as they are probable can it be hoped that common sanitary improvements, which will certainly banish some other diseases, will also destroy the sources of these ordinary dangers of childhood. With confidence, however, it may be anticipated that under the influence of such improvements, these diseases, though their sources be not extinguished, will become greatly less destructive of life among persons who contract their contagion."

---

[*] It will be seen from the following extract from the Annual Report of an experienced Medical Officer of Health of a large and important London Parish for the year 1869-70 that this duty is still liable to be neglected. Writing of the Scarlatina outbreak in that year, he observes, "During this epidemic great efforts were made to arrest its spread, but without much avail. There was, however, evoked a fear and dread I have never previously witnessed in any other epidemic. Help when most urgently needed could not be had. A house wherein was Scarlet Fever needed no red cross marked upon the door to prevent communication. No one would come nigh, neither relation, nor friend, nor acquaintance, nor nurse. Those who had their families down with this disease had to struggle and watch, and work unheeded and unsympathized with as best they might. Doubtless, this selfishness was sustained by the means taken to stay the disease."

[†] The term "zymotic" has been given by the Registrar-General to a certain class of diseases from the Greek word "zumos," or ferment, on an assumed analogy between their phenomena and the phenomena of fermentations. They are seven in number (See Registrar-General's 1st Quarterly Report of 1870), viz., Small-Pox, Measles, Scarlet Fever, Diphtheria, Whooping Cough, Fever, Diarrhœa.

How indeed can disease rank as non-preventable, when Dr. Farr writes as follows in the Annual Report of the Registrar-General of the same year? "As Athens in ancient story had to send seven of its youths chosen by lot to be devoured, so London has hitherto given up ten of every thousand of her inhabitants yearly to disease and untimely death. All the towns of the kingdom in the aggregate gave up proportionally this number of victims in the last three months. They were not destroyed openly. The poison by which they died was not purchased in chemists' shops. It was administered in the silence of the night, and in the streets at noonday, either with the air which they breathed, or with the water which they drank. The poison is generated by the decomposition of effete organic matter which gives off diffusible and dangerous products, wherever it is left beyond a day in the houses, streets, and neighbouring ditches or streams, instead of being lodged in the disinfecting earth. It can easily be shown that the mortality bears a certain proportion to the quantity of poison which the people inhale, and that the quantity is greater under the cesspool system. The mortality has gradually fallen in London as the cesspools have been abolished. In Manchester, where the dirt is allowed to decay behind the houses, and is not thrown into sewers, the mortality was at the rate of 33 per 1,000 in the ten years' average from 1841 to 1850." And in the preceding year the same authority, in commenting on the average general mortality of the 19 years from 1838 to 1856, which stood at 22.36 per 1,000, says:—"Is that average, it may be asked, the true standard? What is the natural rate of mortality among Englishmen under favourable sanitary conditions? Under such conditions how long do they live? How many of them die annually? No large body of Englishmen is breathing pure air, living on a perfectly sound diet, free from all defilement and free from vice, exercising duly the mind and body, generation after generation. We can point to no model city—to no model caste: we can discover no model parish in the country. In the matter of health we are all very ignorant or desperately negligent. What courses then remain open to the inquirer? One only. The mortality of the districts of England in which the sanitary conditions are the least unfavourable can be employed as the standard measure, until happier times supply the real standard of vitality. Sixty-four districts in various parts of the country are found where the mortality of the people ranged, on an average extending over ten years, from 15 to 17 deaths in 1,000 living. This is not an accidental event; the mortality only fluctuates in such places from year to year, and the death-rate under the same circumstances will not be exceeded. Undoubtedly the sanitary conditions in which they live are in many respects favourable, but visit their dwellings, and you will discover many sources of insalubrity. The bedrooms are small and close, personal cleanliness is not studied, the dirty pig, and filth of various kinds lie in close proximity, the land is imperfectly drained, medical advice is ill-supplied; yet the annual mortality does not exceed the rate of 17 per 1,000. Any deaths, therefore, exceeding 17 are unnatural deaths."—"But it may be said this standard cannot be fairly applied to towns which can never become so healthy as the country. All we know is that parts of towns have a mortality only a little in excess, and that the prevalent diseases are referable to causes which have been clearly ascertained, and which evidently from their nature admit of removal. Is the figure of 22.36 inevitable? The excess of England and Wales in the year 1857 amounted to 91,652, and for the whole kingdom to 140,000 unnatural deaths. Who will deliver the nation from these terrible enemies? Who will confer on the inhabitants of the United Kingdom the blessings of health and long life? Who will give scope to the improvement of the English race, so that all its fine qualities may be developed to their full extent under favourable circumstances? His conquests would be wrought neither by wrong nor human slaughter; but by the application of the powers of human nature to the improvement of mankind."

---

* R. Rawlinson, C B., in the Social Science Transactions of 1863, p. 582, stated that the residences of the nobility are often in the worst sanitary condition, evincing on their part the worst practice with regard to the arrangement of air, and the not infrequent fatal results in invalids' chambers, in splendid lofty rooms, from neglect of the simple precaution of having the upper window made to open, are stated by Dr. Acland in his Evidence before the Thames' Valley Commission, 1866, p. 71.

But to come to particulars. Suppose we take Scarlatina as a test—Scarlatina, at once the most infectious, the most fatal, and the most injurious in its lasting effects on those who recover. Scarlatina was declared, in the Annual Report of the Registrar-General for 1867, to be at present the most dreadful scourge in Europe. In the two years 1863 and 1864 it destroyed in England more than 60,000 persons, and 31,000 deaths occurred in the past year from this cause alone. The subsequent periodical reports of the Registrar-General's office are full of its spread and ravages in different parts of the kingdom, and we have had a fatal acquaintance with it during the last five or six months in this city. Scarlatina is pronounced by Dr. Farr to be so infectious a disease that there are great difficulties in hedging it in, and the humane efforts of the Medical Profession in battling with it are said to have too often been defeated, but the crowded quarters of our large towns are declared to present all the conditions favourable to its extension, and although it is found under all conditions, and has been declared by Mr. Simon, in the last Public Health Report, to be profusely contagious and not to be amenable, like Typhoid Fever and Cholera, to moderate sanitary care for its removal, it is said in the last Quarterly Report of the Registrar-General to be most fatal where the sanitary state of a place is unfavourable. It may then justly be doubted whether the Scarlatina death-rate of Bristol can properly be quoted apart from the general death-rate as it has lately publicly been, as if it were something unconnected with the sanitary condition of the city. In fact, in his last Quarterly Report, Dr. Farr specifically refers to the Scarlatina, Fever, and Diarrhœa death-rates of Bristol as "implying some essential defects in the dwellings, sewage, water supply, or other hygienic conditions which mere quarantine arrangements do not meet." How then can Bristol with its polluted Float and its River doing the office of a common sewer,* and rendering itself too perceptible to the senses, at intervals, even on this elevated plateau,† and the more than suspicious quality of its town well-water as described in the paper read before the Social Science Conference by a Townsman in 1868, and the crowding and condition of a large portion of its teeming population, where the greatest wealth was found by Dr. Hunter, in the year 1865, side by side with the "blankest poverty," or how can Clifton, with its unventilated sewerage and its Hotwells and Redland Quarry regions, claim a clean Bill of Health by excluding this epidemic from view? Bristol is not one of those sanitary sleepy-hollows where everything is sacrificed to the one object of keeping down the rates, nor does it belong to the class of those pretentious watering-places where sanitary arrangements, as Dr.

---

* It is not intended to assert that the condition of the Float and the River necessarily exercises any direct effect on the Public Health, however per-

---

ceptible it may be to the senses. Water *preserving the same level*, or as a tidal stream, can receive any quantity of sewage without actual injury to the population on the bank. This fact has been repeatedly affirmed by R. Rawlinson, C.B., as the result of his experience and official inquiries into River Pollution. A canal in a north-western town was so foul, and it disengaged gases so abundantly that they burnt freely with a lambent flame when fire was applied, yet it is expressly stated that the health of the neighbourhood was not impaired. Indeed, in the year 1826, when matters in Bristol were much worse than they have ever been since, we are told that the chief medical men of the city made affidavits that the effluvia was not unwholesome.—(Appendix, 2nd Report of Commissioners of Inquiry 1845, p. 66.) It is not so much what is above or upon the surface, as what is below the surface in sewers and drains that causes the mischief. Still with reference to the position of the Float and its feeder, the Froome, in the heart of the thickest of the population, the discharge of any sewage or other refuse into the Float cannot the less be regarded as an unmitigated nuisance, and a grievance to the community at large. The visitations of Cholera to the river in 1866 were light, and chiefly confined to one outlying village at its mouth of notoriously evil sanitary reputation. (Report of the Cholera Epidemic of 1866, p. 224.)

† 300 feet above the river bed.

Gairdner says, are usually an after-thought, and where, as Dr. Farr tells us, "they throw into the waters of the sea where visitors bathe, the offensive matters which would fertilize the disinfecting soils of the surrounding fields," but it is a city of ancient trade and old historic renown, and of active commerce now, and it has great and worthy ambitions for the future. Bristol with ocean docks affording a long-wanted South-Western Port and outlet for trade, and a free passage into the broad Atlantic, with no Irish sea to traverse, and no North Irish Coast and Islands to thread its way through, and no monitory disasters like those of the Royal Charter, or last but not least on the list, the unhappy Cambria, to meet the voyagers when nearing their port, has a great and assured future before her. Only she should set her sewerage and river in order betimes, in preparation for it, instead of banishing these things into some unknown period. *

---

* By these remarks it is not intended to intimate any disrespect to the powerful and active Corporate body which governs Bristol. More than 10 years ago the herculean task of bringing a mediæval seaport city, thronged additionally to excess by the aggregation of modern commerce, up to the level of the day, was undertaken by them, and it has been carried forward of late years with much energy. But during this period the methods of disposal of refuse have materially changed. Formerly "the old and approved system of drainage was to gather everything together and discharge it directly into the nearest river." More recent opinions disallow such a means, and the towns throughout the country are consequently in the utmost difficulty how to proceed. Some such difficulties may have presented themselves in inducing hesitation in carrying into effect the carefully elaborated scheme of intercepting the sewage on both sides the river, which was discussed before the Board in February, 1870. The *opus magnum* of conveying it away altogether appears to have been postponed *sine die*. The same cause appears to have operated in a suspension of the drainage of the St. George's District, which now adds its periodical heavy quota of un-

Next to Scarlatina comes her sister Diphtheria, a newly-revived type of an old disease,[*] the declared product in its epidemic form of the putrid emanations of the French *cabinets*,[†] "a disease new to England in its present form before the year 1855, and exceedingly fatal since." So imperfect is the sanitary organization of the country, that this terrible disease, which at its origin was confounded with malignant sore throat[||] is said by the Medical Officer of the Privy Council to have prevailed and spread for the space of two years before the Public, or even the Medical Authorities themselves had any cognizance of the fact. In an extensive inquiry made into this disease, by order of the Privy Council in the year 1859, it was pronounced by their Medical Officer not to have any immediate connection with unsanitary conditions as its essential cause, but the importance of attention to such conditions was insisted on. However, as inquiries extended and facts accumulated, a closer connection of Diphtheria with the causes which are said to have reproduced it in the present century was recognized, and it is now classed by the Registrar-General[‡] with Scarlatina as a disease aggravated by those conditions. The other ordinary epidemic diseases were found by

---

healthiness to the (so-called) Clifton Registration District, a misnomer which has called forth protests on the part of Clifton proper, ever since it was made the subject of a paper read before the British Association in the year 1864 by J. A. Symonds, M.D., F.R.S.E.

[*] 21st Annual Report of Registrar-General.

[†] 30th Annual Report.

[||] 27th Annual Report, p. 191.

[‡] 29th Annual Report, Registrar-General, p. 175.

Dr. Hunter, in the course of his inquiry in 1866 into the Sanitary results of town improvements, to be more or less lessened by them, and amongst the endemic diseases, Consumption, in particular, was declared to have been particularly affected for the better by the drying of the Town areas consequent on their sewerage operations. The inquiry, as regards Consumption and its relation to dampness of soil, was followed up into fuller and more extensive detail in the following year in the South Eastern District of England, in the 10th Volume of the Public Health Reports. The different qualities of soil in the different localities were described, and the general conclusion arrived at was, that wetness of soil was a cause of Consumption to the population living upon it. The importance of this inquiry and conclusion may be judged of by the fact that Consumption constitutes, at present, an eighth part of the entire mortality of England.

But it is to the diseases called *endemic*, that is to say, diseases to which the inhabitants of a country or place are peculiarly liable, and which seem therefore to arise from local causes, that I wish to direct your attention. *Epidemics*, as has been shown, we can prepare ourselves to encounter by attention to the sanitary condition of our houses and towns, if we cannot prevent them, but *endemics*, such as Typhoid fever, Diarrhœa, and other endemic bowel affections, are said by Mr. Simon to be well known as standing in intimate relation to the pollution of air and soil and water with decaying excremental matters, and these, we are told, when they attain a certain degree of virulence, become epidemical in their character "amongst populations living under the same conditions." "Death is inevitable," says Dr. Farr,* referring to the number of 134,000 persons who died in the year 1867 in ripe manhood between the ages of 25 and 65, and to the number of 242,000 who were cut off and perished in childhood and youth, "but why is life cut short? Existing knowledge places at the disposal of men an incalculable control over the duration and happiness of their lives, and it opens to the future a prospect of discovering protection against many of the dangers which beset the human race." Indeed, Mr. Simon went so far as to affirm, twelve years ago, "That Boards of Health, provided the water supply be not impure, can virtually guarantee urban populations against epidemics of Typhoid fever, Diarrhœa, and Cholera;" a mighty power, truly, over disease, and a beneficent one, if rightly used, for although Cholera was quiescent in the year 1867, the latest year of our Annual Official Returns, and that year, following as it did on two epidemical years of unhealthiness, was regarded altogether as a healthy one, Fevers and Diarrhœa together carried off 36,700 persons, or if the usual number of ten sicknesses to one death be reckoned, then 367,000 were withdrawn that year from life and productive labour, and laid on the sick bed from those two causes alone, to recover, many of them, with shattered constitutions.

---

* 30th Annual Report of Registrar-General.

The visitations of Cholera have, mercifully, not been added to the miseries of the Continental War now raging, and our island has been spared that infliction, in which, if it had appeared elsewhere, we should most probably have shared, but in the meantime it is well that we should gather up a portion of our own past experiences as delivered to us by the first authorities of the day in relation to it. In Newcastle and Gateshead, where the Cholera in 1853 killed as many as fell on the field at the battle of Waterloo, the cause was traced to the Water Company's having, in ignorance of the possible consequences, drawn a third part of its supply from the tidal and refuse-receiving Tyne. On the Company's ceasing to use that means of supply the Cholera sensibly abated.* A second instance may be quoted of two large London Companies on the South side of the Thames, who severally supplied their intermixed customers in 1854 with two kinds of water, the one an impure water from the lower part of the Thames, the other a purer water from a higher part of the river. The Cholera mortality in one class of customers was 3½ times more than amongst those of the other, and the difference in the effects was distinctly traceable, even amongst the inhabitants of the same street using the two waters. A third instance is mentioned in the same Volume (12th Report of Public Health), namely, the Theydon

---

* Cholera Report of 1866, p. 33—39.

Bois case, a detached farm-holding near Epping, where, within a fortnight, "in that one little circle eleven persons had been attacked with Cholera, mother, father, grandmother, two daughters, son, doctor, servant-lad, servant-maid, labourer, and a country woman who had assisted in laying out one of the corpses, and of these eleven only three survived: the son, a daughter, and the serving lad." It was afterwards discovered that there was an habitual soakage from the closet into a well beneath the floor of the scullery whence all the drinking water of the house came. The seeds of Choleraic infection brought by some of the family from the South Coast, where the Cholera had appeared, falling on ground previously prepared to receive them, and adding their poisonous elements to the already contaminated water, produced the catastrophe. A fourth instance was afforded by the East London Cholera Epidemic of the same year, where the sudden and virtually contemporaneous development of the outbreak nearly seven times greater than in the rest of the metropolis, 3,613 people having perished within the first six weeks, indicated a medium of propagation common to the area of its diffusion. Without entering more particularly into the interesting details of the inquiry instituted by the Government into the facts of this remarkable case, which presents all the minuteness of narrative and all the chains of circumstantial evidence of a criminal trial, the investigation narrowed itself by degrees to the facts of whether the water in some disused reservoir of the Water Company's works, at Old Ford, had or had not been distributed for public use at that critical period, mingled with soakings in from the Lea, which, at that spot was little better than an open sewer, and whether it had or had not been filtered prior to delivery. The first point was inferred from a minute and careful local inquiry. The second was, after much evidence pro and con, settled in the negative against the reservoir, by the finding of putrid eels in some of the house water-pipes served from it. Over the bodies of these eels as tough a combat was fought as between the Greeks and Trojans over the body of Patroclus, but the Government carried the day. These are but the gleanings of the last Volume of the Report on the Public Health. Numerous other cases equally striking could be adduced from the other volumes.

It is indeed remarkable that the instincts of the people, at times of pestilence, had from the earliest periods connected the attacks with water, although they wholly misconceived the agency. So early as the plague of Athens, the people giving loose to their own fancies concerning the authors of their calamities, accused the Lacedemonians of having poisoned the wells of the Piræus. In the pestilence known as the Black Death during the 14th century, the Jews in Italy were accused of having poisoned the fountains with poisons brought with them from India; and we are told, in the Cholera Report of 1866, that similar suspicions "exciting the populace to madness and to murder," were directed against the Medical attendants in Hungary, Naples, Paris, and elsewhere, during the time that the great wave of Epidemic Cholera was passing over Europe in the years 1831 and 1832.[*] It was not, however, until the charge was fairly and fully brought home by Dr. Snow in 1854, not to an individual, but to the Broad Street Pump, St. James's, London, by a chain of circumstantial evidence, that the facts began at all to present themselves to the unprofessional mind, even as a possibility, and how few there yet are who at all know, or care to know, anything about the main agent of our chief and most deadly diseases, one which has been declared by Dr. Lankester to be a solvent as powerful as aqua-fortis, or oil of vitriol,—Water! [*]

---

[*] In an instructive and interesting narrative of the Cholera outbreak at Exeter in 1832, by Dr. Shapter, in which all the main features of Defoe's "History of the Plague in London" re-appear, the insults and threats of personal violence to which the medical men were subjected at the time of the first appearance of the disease are told. Even so late as the year 1867, more than eighty persons, including whole families, were murdered in Calabria, under suspicion of their having been instrumental in diffusing Cholera poison (Medico-Chirurgical Review, July, 1868, p. 221.)

[*] See Dr. Lankester's instructive Address on Health (Transactions of S. S. Association of 1865). In this Cholera outbreak, which is described by Dr. Gairdner "as one of the most truly appalling local pestilences, if not, indeed, the very severest and most fatal that has been known in this country since the time of the great plague," out of a population of less than 4000 persons 660 died in 14 days. The cause was afterwards traced to a communication existing between this well, a favourite in the neighbourhood, and a closet in the house in which the first case occurred, aided in its epidemical effects by the generally bad sanitary conditions of the locality, viz., a patch of gravelly soil filling up a hollow in the London clay, traversed by leaky drains, and perforated with absorbent cesspits, the impurities descending into and mixing with the well-water, and pumped up thence with the Cholera *virus* superadded for the use of the neighbour-

In regard to the connection of these Diseases with Water, the Medical Officer of the Privy Council has made in the 12th, or last Volume of the Report on Public Health, just issued, the following remarkable statement, "Of the many invaluable additions and improvements which medical knowledge has received within the last quarter of a century, scarcely any can in my opinion be compared, for present practical importance, to the discoveries which have given scientific exactitude to the general doctrine that a vast influence is exercised over the health of communities by the quality of the water which they consume, and have enabled us definitely to connect the epidemic spread of bowel infections in this country with the existence of certain faults of water supply. Not only is it now certain that the faulty Water supply of a town may be the essential cause of the most terrible epidemic outbreaks of *cholera*, *typhoid fever*, *dysentery*, and other allied disorders; but doubts are even widely entertained whether these diseases, or some of them, can possibly attain general prevalence in a town, except where the faulty Water supply developes them.' He adds (p. 26), "The deaths by diarrhœa indicate the same results and lead to the same conclusions." These statements are but repetitions of the doctrines enunciated by the same authority on the same subject, from the date

hood. It is noteworthy, that the only cases of Cholera that occurred at Hampstead that year (1866), were those of two residents, a mother and daughter, who were in the habit of sending for a regular daily supply of water from that particular well, in belief of its excellence.

of the Report of the General Board of Health in 1858 down to the present time. In some local inquiries relative to the methods of removal of refuse from the Towns reported in the same volume, Drs. Buchanan and Radcliffe follow in the same track by observing, "the propagation of certain epidemic diseases, especially cholera, enteric fever and diarrhœa, among communities, as the result of excremental pollution of air and water, is one of the best established facts of sanitary medicine. It is a fact which has been admitted for over a century, and still various inquiries of this department (themselves affording repeated evidence of its truth and importance) are showing that it remains *without practical recognition by a large proportion of the health authorities of the kingdom*" (Idem, p. 111). Once more in treating of Typhoid Fever outbreaks, the Medical Officer of the Privy Council observes, "Among the circumstances which we find associated with outbreaks of Typhoid Fever, there is none of more frequent occurrence, none which we are more entitled to consider directly causative of the disease than the consumption of putrid water. It has been one of our most familiar experiences, one which my reports for many years past have again and again been obliged to exhibit in all its nauseous details, and which in the present report receives a new and striking illustration, that excremental fouling of wells is, in this respect, among the worst dangers which can threaten the health of a community." (p. 31.) The instance is given of the Town of Guildford, where there was a Typhoid outbreak from that cause, occasioning 500 cases of fever and 21 deaths, between August and December, 1867, among a population of 9,000 persons. The cause was clearly traced, afterwards, to the passage of sewage from a leaky drain through the porous chalk stratum into a new well from which the high service reservoir was filled.

But one of the most remarkable cases on record of the direct connection between Typhoid Fever and Water was afforded in this very place, as recorded by Dr. Murchison in his well known volume on Fevers, p. 446. "A terrace was composed of 34 houses. In 1847 the inhabitants of 13 of these houses drew their drinking water from a well at the end of the terrace. The remaining houses were supplied with water from another source. At the end of September it became evident, from the taste and smell of the water from the pump, that it was tainted with sewage. Early in October, intestinal fever broke out nearly at once in all the 13 houses in which tainted water had been drunk, but it did not make its appearance in any of the other houses. In almost every one of the 13 houses, 2 or 3 persons were laid up, and in some a much larger number. The houses in which the fever broke out, were far apart in the terrace, and there was little or no intercourse between their inmates. The water from the well was the sole connecting link." I have the less hesitation in referring to this case, as it occurred long ago, and since that period abundance of untainted water has been supplied by the Water Company to Clifton, so that the health of households, as regards their freedom from this dangerous disease, rests entirely with themselves.

Another Typhoid outbreak in connection with water took place in the Village of Terling in Essex in 1867, amongst many other cases adduced in the Public Health Volumes. In this case the Village stood on a porous gravelly soil which filled up a cup-shaped hollow in the clay sub-stratum. To use the words of the Public Health Report, "every possible source of pollution for air and water was accumulated round what pretended to be the house accommodation of the tillers of the soil (a scanty overcrowded supply of dwellings of the meanest description). The soil which underlay all this filth was of course continuously absorbing it. The water supply of this population was derived from wells, most of them sunk in that excrement-sodden sponge of earth; some ten days before the outbreak of the fever, after an extraordinary period of drought, a sudden great rise in the water-level of the wells was observed; and this of course denoted a long-delayed scouring of that foulest soil into the water supply of the now poisoned population. Out of a population of 900, 300 were attacked with Typhoid fever within three months, and 41 died." It may surprise you to learn that, according to a paper publicly read at the late Meeting of the Social Science Conference here in 1869, the position of part of the City of Bristol is not dissimilar. It is given in pp. 460

and 461 of the Transactions of 1869, "as an instance of horizontal but porous strata, lying against impervious rocks of limestone, receiving the subterranean flow from the inclined beds, and retaining it as a natural reservoir. The consequence is, that should any one source of impurity arise in any one part, it would affect the whole. There are two well-filled burying grounds within a short distance of each other, the graves of which are inserted above or into this bed of sand, and it will require no very elaborate chemical evidence to draw a decided inference. The parish may be shortly described as a porous reservoir, having the coal measures for a base. Large quantities of ammoniacal salts, having evidently an animal origin, are found in all the wells." This anticipated danger may easily be guarded against by abandoning the use of the wells, and taking the water provided by the Water Company, whose works, as may be seen at the Barrow reservoir, are on a very large scale, and whose water, drawn as it is from the distant hills, is beyond all suspicion; but here the difficulties connected with a Water Supply other than by the Local Authority, present themselves. These were set forth in the discussion which followed upon the reading of the above paper, when R. Rawlinson, C.B. observed, with reference to the startling unfavourable results afforded by an analysis of the Water of the Town Wells, "it was the duty of every local authority to supply its own population with Water, and not the duty of a commercial body who could not be made to abolish defiled wells. If the Corporation of Bristol wanted a supply they could obtain it for the public benefit, and they could compulsorily abolish all the poisonous wells, and as it would be the property of the ratepayers, they could compel the landlords to take the water." To which the opinion of a competent authority (Mr. Michael, F.C.S.) was added, "that it was in the power of a Local Board of Health to supply water to the poorer population at 2d. per week, but there was no power to force a Water Company to supply it at that price. The consequence was that the poor were unable to obtain an adequate supply of water."

But Typhoid, otherwise in its milder form Gastric, and in its worst form, Putrid Fever, * is not dependent for its conditions on Water alone. It is called by Dr. Hunter, in the 9th Report on Public Health, "the ordinary endemic fever of

---

* See Murchison on Fever. Mr. Simon, the Medical Officer of the General Board of Health, says in his Report of 1858, "There are certain diseases of which it is hardly a metaphor to say that they consist in the extension of a putrefactive process from matters outside the body to matters inside the body; diseases of which the very essence is filth; diseases which have no local habitation except were putrefiable air or putrefiable water furnishes means for their rise or propagation. Yet some tens of thousands of deaths annually arise in England from these diseases."

Eight years ago the annually recurring cases of Typhus and Typhoid were estimated by Dr. Farr (25th Annual Report, p. 177), at 152,600, of which 18,000 died, each case implying about a month's sickness. This period of convalescence is extended by Dr. Anstie in severe cases to not less than three or four months (Notes on Epidemics, p. 90), before the patient can be considered as fit for work. In 1864, the cases had risen to 165,400 (27th Annual Report, p. 191), and the deaths to 20,000 "young men and women in the prime of life being chiefly attacked." This mass of life and working power subducted from the country's capital, appeals to reason and humanity for a remedy.

country towns," and is said by him to have coincided in its reduction with the public improvements, particularly with regard to water, but most by the purification of the atmosphere from decomposing matters, either by the abolition of cesspools or by draining and drying middens. But even drainage has its dangers. You may abolish cesspits, "the source of zymotic disease," from the neighbourhood of your houses by proper sewerage, but unless you are guarded against the return into your dwellings of the gases of decomposition from the sewers, you may be worse off than before. "In fact the old-fashioned cesspool was a nuisance which affected a limited area, and was capable of being kept under some control; modern drainage systems diffuse poison through the air and water indefinitely, without giving warning of danger or leaving means of escape." Worthing and Croydon are particularly instanced in that volume as examples of the evils of sewer gases. In Worthing, owing to the faulty arrangements at the outfall works, the sewage was backed up the sewers carrying the gases back with it, and fever was generated which almost exclusively attacked the houses on the higher levels, where the water closets were inside the houses, and almost entirely spared the houses, mostly of a much poorer sort, situated on lower levels, where the closet was placed outside the houses. The Croydon outbreak was, on the other hand, occasioned by a too air-tight system of pipe-sewerage, without any provision for ventilation, and the inhabitants of the best to-do houses in the upper parts of the Town were again the chief sufferers.* At Llanelly, in the Cholera visitation of 1866, the higher and better houses suffered from the same causes, (Evidence, Royal Sanitary Commission of 1869), and the same occurred in a severe outbreak of Typhoid fever at Rotherham reported in the 6th Volume of the Public Health Reports.

Another, and a very remarkable case of Cholera outbreak occasioned by sewer *miasma*, is reported in the 9th Volume of the Public Health Reports for the year 1866. The Infirmary of the City of London Workhouse, "a palatial building," stood in a detached position at the furthest extremity of the Workhouse enclosure. The Infirmary was the most distant of any other part of the buildings from the public sewer outside, but under the drainage arrangements of the Workhouse, its drain was brought into a more direct and continuous connection with the sewer than any of the other drains. Cholera was prevalent in the neighhood at the time, and the public sewer was charged with Cholera poison. A great and sudden change in the temperature and barometric pressure, occurring at that crisis, caused an efflux of *miasma* from the Sewer, which bore with it the Cholera infection past the other buildings on to the Infirmary, where it struck down on its way the Porter and Stoker of the Infirmary who were employed outside, and penetrated within. 42 persons out of the 148 Infirmary inmates were attacked, and 27 died. The Imbecile wards, which occupied the corresponding building on the other or western side of the Workhouse, escaped infection, owing to the simple circumstance of the drain on that side having been made to empty itself into the Workhouse main drain *at an angle*, so as to impede the continuous reflux rush of the Sewer miasma into that side of the enclosure, and to its fortuitous greater aeration by means of intermediate open latrines. The general population of the rest of the Workhouse, numbering 617 souls, escaped entirely, untouched either by Diarrhœa or Cholera. On such apparently casual conditions do the issues of disease and death often depend!

---

* Dr. Alfred Carpenter states, "many facts have been brought to my observation as to the power of sewer gas, or some matter conveyed by sewer gas, to produce disease. As a factor in the production of typhoid fever, its power is now well known; many other disorders of the system have been directly traced to its influence—thus, diarrhœa; dyspepsia in all its forms; palpitation of the heart; various forms of asthma,—indeed it may help to explain some of the vagaries of this curious disease; convulsions, especially in teething infants; headaches, both persistent and intermittent. The evils which sometimes attend or follow on the puerperal state,—as milk fever, abscesses in the breast, and *phlegmasia dolens* or white leg, are frequently caused by it." (Paper read at a Sessional Meeting of the Social Science Association on the influence of Sewer Gas on the Public Health, Hardwicke, Piccadilly, 1870.) Dr. Trench believes the disease propagator or germ of infection communicated by sewer gases to be a matter *sui generis*, and floated by the ammonia. (Evidence, Mersey and Ribble Basins, 1870, p. 243.)

There is one case in connection with this part of the subject, of melancholy interest to the nation at large, as well as of warning. The details are given in the 1st Volume of the Report on Public Health, and in Dr. Murchison's Volume. In the last quarter of 1858 an outbreak of Typhoid fever occurred in the Town of Windsor, and 400 cases and 26 deaths followed within that time in a population of 9,500 persons. Attention was roused, and a local inquiry was made by Sir James Clarke. Windsor is situated on an area of varying levels with an outfall for its sewerage into the Thames. The house drainage was found, generally, to be faulty and ill done. The sewerage of the Town itself was said to have been well designed and appeared to have been well executed, but its flushing arrangements were insufficient, and had been rendered still more so by the dry weather, and no ventilation had been provided for it. If the sewerage had been well attended to and kept in good working order, it would have been complete and efficient. There had been a long drought, and the sewers were in a foul condition. Noxious Sewer gases were largely generated. The wind blew up the mouth of the main sewer, and carried them to the higher parts of the town. The gases, aided by their own tendency to ascend, were forced upwards. If ventilation had been provided at the upper end of the Town Sewers, then, it is expressly stated, the gases would have passed off innocuously. As it was, they diffused themselves in the houses at the higher levels, and in other parts of the town, and the sewer atmosphere, being at the time, from accidental circumstances, at about its maximum of poisonousness, an outburst of epidemic fever was the result, in which all classes alike suffered. Two localities were specially noted in the Report as having had an exceptional immunity, viz.:

1st, one of the worst and poorest parts of the Town, which had suffered severely from Cholera on a former visitation of that disease, and the cause of its exemption is given. Although the drains of this quarter were wholly unflushed, there was no direct communication by sinks or otherwise between the drains and the interior of the houses, whence its freedom from attack. 2nd. Another exemption was, it was reported, *happily* found in the Castle, which had a drain of its own unconnected with the Town drainage, with a separate outfall into the river, well ventilated and well flushed, and the immunity was the more marked in consequence of some part of the Royal Stables and Collegiate residences which were connected with the Town Sewers, and which, being the highest situated of the outlying buildings were most exposed to the upward rush of the Sewer effluvia, having participated in the Town disease. *Unhappily* for the Nation, the reporters were in error, and the Prince Consort, at whose instance the inquiry had been instituted, and "whose far-seeing sagacity in sanitary arrangements" has been borne testimony to by the official narrator of this sad tale,* was mistaken also. Two years afterwards the Prince Consort himself sickened, and he, whose virtues during his lifetime the nation were too slow to acknowledge, and whose loss we still deplore, Albert the Good, perished in the prime of life, like a common Terling peasant, of Typhoid Fever.

---

* R. Rawlinson, C.B., Transactions of 1863, p. 562.

Pallida mors æquo pulsat pede pauperum tabernas,
Regumque turres.*

The regulation of the Town Sewers rests with the Sewer Authorities of each place, who also exercise by means of their bye-laws, or are understood to exercise, a general superintendence and control over the planning and construction of the house drainage also. It may then fairly be asked what practical instruction, as regards matters within our individual control, is to be drawn from all this detail. I answer, several things. 1st, never drink well water, and particularly Town well water, if by any possibility you can get any other supply.† A well is but an underground cistern, drawing its supply from the minute arteries and larger water veins which it intersects, and which in their turn are fed by percolations from the area above. If the area be pure, then the earth through which the water passes in its gravitation downwards, is Nature's best filter. But if it is impure, as town areas invariably are, then the water carries down with it a body of impurities which evolve gases for which there is no outlet, * and the water instead of being purified by filtration, as commonly supposed, becomes infected and tainted with noxious sewer ingredients. The sparkling and sweetness of such water is often discovered by scientific analysis to be due to nothing else but to the bubbles of most deadly sewer gases. Instances are given in places of wells near churchyards, and the like, ignorantly preferred by the people for the very qualities which, if local circumstances co-operated, might at any time constitute death in the cup to the drinkers. Nor are taste nor smell sufficient indicators of quality. Mr. Rawlinson reports † from Dr. Angus Smith's investgations at Manchester, that one well was so near a Cemetery that there was a perceptible fatty scum upon the surface in the morning, and when evaporated there was an absolute residuum of animal matter, which on burning produced foul gases, and yet the parties in the vicinity drank it and did not complain, and some of them thought it excellent water, and Dr. Seaton in his investigation‡ into a Typhoid outbreak in a newly-built hamlet of Tottenham, which was clearly traced to the use of the surface well water there, reports that the water was

---

* Since this was written another striking instance of the unforeseen perils to which houses in connection with sewers of steep gradients are exposed, has been afforded to the Nation in the late dangerous illness of H.R.H. the Prince of Wales, occasioned, according to the opinions of the medical journals and other authorities, by similar conditions and causes. (See "The Prince's Illness: its Lessons," by Balthazar Foster, M.D. Churchills, 1872.)

† Liverpool, like a part of Bristol, stands on the new red sandstone, and the extent to which the water even of its deepest wells is contaminated by the dense population of the Town area above them, is shown in pp. 118-119, Report of the Royal Commissioners, Mersey and Ribble Basins, 1870, in very surprising figures. The two worst wells (now closed) were, respectively, of the depth of 149 and 123 feet down to the bore-holes. Liverpool ventilates its sewers by means of various contrivances, but very imperfectly. Bristol does not ventilate at all. Liverpool "would rather face any difficulties arising from a sudden influx at its port of fever patients, and provide for their accommodation at the workhouse hospital, than be permanently embarrassed by a rate-built Fever hospital." (Evidence, Royal Sanitary Commission, 1869, p. 415.) Bristol follows the example.

---

* See Sewage Question, by Krepp, p. 56. (Longmans and Co.)

† Select Committee on Sewage, 1864, p. 175.

‡ 9th. Vol. Public Health Report, p. 217.

bright and pleasant, and a favourite with the people, who were surprised at the notion of there being anything injurious in it, and amused at its being analyzed. It is not that such water is necessarily poison, but it may, at any time, become so, if at any time the ferment of choleraic or typhoidal discharges should happen to mix with it. Dr. Stevenson Macadam puts it thus:*—"Whilst impure water is decidedly unwholesome, I do not consider that contaminated water of itself will necessarily engender disease, but I firmly believe that the daily use for dietetic purposes of impure water will influence the healthy state of the animal frame, will predispose individuals to attacks of disease, such as Cholera, and will thus, indirectly, if not directly, aid and abet the propagation of disease, and aggravate its attacks." If a judgment were formed from the analytical results of a certain number of the well waters of Bristol and Clifton in a paper read at the Conference here, then nowhere are these cautions more needed. The Analyst concludes with "I should ill discharge my duty as a citizen if I did not warn my fellow Bristolians that a time may come, at any moment, when an insidious and unsuspected visitor from the pump may pass into their houses, and may cause a loss, which a little foresight and prudence would have prevented."† Of what use,

---

* Public Health Journal, March, 1868,

† There is a most unfavourable analysis of the Spring in All Saints' Lane, Bristol, in p. 126, Report of Royal Commissioners, Mersey and Ribble Basins, 1870, showing it to be the worst of the 52 samples in the table. Yet its water is reported to be clear. The Spring is said in a note "to be much

I would ask, are Social Science Conferences and Papers, if no heed is paid to the instruction which they convey?

Next be on your guard against Sewer gases.*

used in the neighbourhood, and by the small trading vessels that lie on the Welsh Back." Some fallacies have lately found their way to the local Press respecting water. We have been told that impurities in water are of a protective nature, and constitute something for which our special thanks are due, that fish like clean water as much as we do, and that the presence of animal life in drinking water is, consequently, evidence of its purity, and the like. The science of the day and our instincts alike rebel against these sanitary heresies.

* In the 7th Vol. Public Health Reports, p. 62, it is stated that Sewers in Bristol and Clifton are not ventilated or flushed. The method of closing them, as far as possible, hermetically, has, apparently been resorted to instead, supplemented by vigorous external and internal disinfecting measures, when necessary. This system which, from its novelty, may be described, in the absence of any official explanation of it, as a gigantic experiment (see *Lancet*, Dec. 17, 1870,) may be successful in the lower lying districts, but it is not applicable to the higher levels which rise at once from the outfall in the river to a height of 230 feet, with a gradient of 1 in 6, and traverse afterwards a mile of level ground with a gradient of 1 in 300, receiving the sewage from both sides and sending up branches to the still higher ground of the Downs, and the crowded hive of Redland. In this part of the sewerage district the sewers have to depend for their cleansing on their gradients and the rainfalls, which usually serve that purpose effectually only in the case of pipe-sewerage. Krepp (Sewage Question, p. 52) observes, "The specific gravity of sewage gases being lighter than that of the atmosphere, it stands to reason that the former must tend upwards, and that the speed of their ascent corresponds to the steepness of the sewer-gradient; so that the quicker the sewage liquid flows off, the quicker the gases evolved rise up. Workmen entering sewers invariably experience a current of air running up the house drains like so many chimnies. The fact of the matter is there are few things more irrepressible than these sewer gases. Like Alpine goats they always prefer the highest places, and by means of house drains they are conducted into the very heart of the dwellings." A sewer of steep gradients cannot be prevented from ventilating itself, any more than a living lung can be prevented from breathing, and if no artificial means are provided, it must and will ventilate into the houses. This is the doctrine laid down by Dr. Carpenter, and the sum of the opinions elicited by H.M.'s Commissioners in their latest inquiries. (See Indexes, "Sewer Ventilation," Reports on Aire and Calder, and Mersey and Ribble Basins, 1867 and 1870.) The local sewerage conditions will, shortly, be still further complicated by the construction of a Railway Station and its accompaniments on the upper level.

The medical doctrine of the time pronounces that "special diseases are transmitted by their own effluvia, their own products," yet many cases might be cited from excellent authority, and even from the public papers of the day, in which Scarlatina and other zymotic diseases have been found to be connected distinctly with sewer gases and other unsanitary conditions within the house, as well as outside, "which attract and nurse, if they do not generate them," giving force to Mr. Rawlinson's often repeated opinion, founded on personal examination and experience, that whenever diseases were found in a house, the proximate cause was usually to be met with within the four walls of the dwelling. If time permitted I could present you with an interesting narrative of Dr. Carpenter, showing how the gases got access into the interior of his house by forcing their way up through the inside closet, and struck down his children with Typhoid, that most insidious and dangerous of diseases. Look particularly to your downspouts (so called), which carry off the water from your houses into the house-drain, otherwise you will have an infusion of drain gas into the nearest window. These downspouts are too often made of loose-jointed iron pipes let into the wall, and are very apt to get out of order, and emit the drain *miasma* by unexpected means of access into the interior of the dwelling. Be careful to trap the waste pipe from your bath or slop receptacles, up stairs or down stairs, or any other waste pipes you may have; and whenever a smell, however faint, and the faintest is often the most dangerous, is perceptible, hunt it down and track it to its source as you would a noxious animal, remembering that there will always be a much more than ordinary pressure of gases in Clifton owing to its unventilated sewerage, and the steepness of its gradients. The way in which everything usually left outside, is here, for appearance sake, packed inside, and the objectionable use of cheap iron tubing, with badly cemented joints, for inside soil pipes, instead of leaden ones, render perpetual caution necessary. It is not necessary to caution you against the dangers of untrapped waste pipes from cisterns leading into the house drains, a fruitful source of evil to households, as under the continuous supply system in use here, cisterns are not absolutely requisite, but it is well to remember Mr. Rawlinson's *dictum*, that traps in house drains and in sewers, *if the system of sewerage depends upon them*, are a delusion and a snare. There are no known means of keeping them in order. When water has absorbed its full charge of gas it passes it off again, so that water is no longer a barrier to the gas. "The only remedy is the thorough ventilation of the sewers themselves outside the houses, so that it may become a matter of comparative indifference whether the traps are tight or not." *

One common source of danger may be noticed, to which Towns built on slopes of the lime-stone formation are peculiarly exposed. In such localities it is too often the practice to get rid of the sewage by discharging it into the crevices and fissures found in these formations, to the manifest danger of the inhabitants of the lower levels, thereby producing a cause of contamination to a whole district. Instances of *Typhoidal* outbreaks from this cause in Towns are to be found in the Public Health Reports and the Evidence taken in 1869 by the Royal Sanitary Commission, vide 1st Report, p. 190. So extensive is this practice that it has been commented on in p. 528 of the 7th Public Health Report of 1865 as a "fatal convenience which may to some extent account for the great development of fever in the sandstone countries." There are 40 or more principal places situated on the limestone in this position in England alone. Nor is it confined to Towns only. In country districts it is reported "the drainage is simply of this kind. People dig till they get to what they call a *swilley* which is a fissure in the rock, and directly they get that, they are satisfied, and think they have got all they want in the shape of drainage. The sewage which goes into these fissures must of course pass out somewhere. It is no doubt the cause of the pollution found by our country analyst in the wells."

---

* See "Lancet" on the Liverpool site and sewers, Nov. 19, 1870.

To these causes of mischief may be added a host of others arising from the hasty and incomplete manner in which the great change from the old cesspool system to the sewerage system was carried out at its introduction in the first half of this century, and from the common practice of leaving the old sewers and drains intact when new ones are laid down. These poison holes often found under the basement of houses, and in the most unsuspected places where they were left by the builders imperfectly covered up in order to avoid the trouble of cleansing and emptying, contain a never-failing supply of materials which cherish and mature the specific *virus* of infectious diseases in the neighbourhood of the dwellings." *

I have only time to advert to the cesspits, many of which are said to be still in existence in the upper parts of this neighbourhood. Noxious as such things are in an absorbent soil they are much worse in an inclined rock stratum, and it must be left to your imagination where their contents must ultimately go to through the red sandstone which fills up the hollows of the steep dips of the mountain limestone underlying the geological strata in this neighbourhood. Your Local Board appear to have sewered the Quarry region carefully, but their action elsewhere is restricted by the Law, which requires a proximity to a Sewer of 100 feet as a condition of compulsory house drainage. Now in a matter of such importance, involving as it does the preservation of the slopes of the hill from defilement, if the mountain will not go to Mahomet, Mahomet might go to the mountain, and it may be fairly asked why sewers are not thrown out from the main branches, so as to bring the outlying house drainage within the field of Sewerage operations. I need not tell you to look to your house drains, and if you cannot provide either outside or through ventilation for them, your only effectual safe-guard, to double trap them, is necessary. Unhappily, these things, which ought to be the first of our cares, are too often the last, and the most neglected. The evil does not meet the eye; it does not constantly present itself to the senses. At times we are reminded by visits of scarlatina, or diphtheria, or fever, and by the family sickness or bereavement following upon them, that something is wrong, and we bow the head, and receive the visitation as a message of chastisement, and we do well; but we do not take sufficient heed to the fact that they spring from causes mostly preventable, and that the immediate agency is man's. The apathy in these things of the educated classes, who shrink "from such vulgarisms as drains, and sewers, and the like, as matters beneath their notice, and who expect everything to be done and thought for them, without the smallest care or effort of their own," allows these defects to continue from year to year unremedied, and so we go on until we learn our error when too late, from its consequences.

---

* See the "Builder" 18th December, 1869.

I have only one more observation to make, and it is this. We are told in the Public Health Report of the year 1867, that Bristol, "from some timorous reason of policy," does not allow its

Health Officer, the best of medical inspectors," his proper designation. Now a Medical Officer of Health has specific duties and responsibilities, and occupies, or ought to occupy, an independent position. "A medical inspector," so called, has neither, and holds an "anomalous office."* The want of sufficiently extensive powers in the hands of the gentleman who acts as "Medical Inspector," was commented on at the time of the Birmingham Conference by a gentleman of this City, and it has very lately formed a subject of discussion in the Council Room, and the result is seen in the absence of that full and regular information of our sanitary statistics and condition which it is the office of a regularly constituted Medical Officer of Health to supply, and which no City in the kingdom is so destitute of, as Bristol. At one time we are lost in a mist of exaggerated self-praise; at another we are in despair at epidemics which will come, do what we may. A cloud of obscurity hangs over our periodical Death-rate returns which the brief notices of the Registrar-General's Office fail to dispel, and we lose, at the time we most want it, the benefit of the assurance which the periodically reported exertions of the Sanitary Staff would, otherwise, convey. The childish apprehension of terrifying the community by duly considered official statements of facts, is not a motive which a City like Bristol, with its 180,000 inhabitants, would, it is hoped, willingly entertain, far less can it be supposed that it would desire to assume to itself an undeserved credit by smoothing over any hard facts that may occasionally present themselves. The Bristol and Clifton community, severally as well as collectively, appear to possess a reasonable cause of complaint in being deprived of the full advantages of an appointment, the necessity for which has been urgently advocated for many years past by the first Authorities of the day.*

---

* See the 9th Report Public Heath, p. 64.

The Medical Officer of the Privy Council, in his twelfth or last Public Health Report, intimates the near prospect of an extension of the field of knowledge, as respects the causation of disease, from *zymotic* or contagious diseases into other regions, and Dr. Parkes, in the Introduction to his work on Practical Hygiene, tells us, hopefully and reverently, that in the midst of all our weaknesses and all our many errors, we are certainly gaining knowledge, and that knowledge tells us, in no doubtful terms, that the fate of man is in his own hands. "It is undoubtedly true that we can, even now, literally choose between health and disease: not, perhaps, always individually, for the sins of our fathers may be visited upon us, or the customs of our life and the chains of our civilization and social customs may gall us, or even our fellow-men may deny us health, or the knowledge which leads to health. But as a race man holds his own destiny, and can choose between good and evil; and as time unrolls the scheme of the world, it is not too much to hope that the choice will be for good." It would be well for us, individually and nationally, if we recognized these truths, and acted up to them to the best of our power. But if there is much to cheer, there is also much to discourage. "It is a melancholy task," says Dr. Farr in the 22nd Annual Report, "to record the fatality of diseases arising through the neglect of sanitary arrangements in this and other countries; and to observe so much activity in inventing opportunities of destruction, with so much apathy in applying measures already invented for promoting the well being of the population. Man is the only animal, Pliny says bitterly, that takes a pleasure in the destruction of his own species; surely somebody will one day arise to teach the world the truer pleasure of saving mankind."

---

* The crown of the high-level Clifton Sewer at the outfall into the river was knocked away many months ago in the progress of certain works in the bed of the river, together with the flap in use at the bottom of the sewer, and the opening, fronting, as it does, the prevalent quarter of the wind, diffused the sewer gases amongst the houses on the hill, besides dispersing the stenches complained of in the immediate locality, whenever the downward draught set in. It was stated at a late Board of Health Meeting that the men working there did not suffer, but the men do not sleep or live in such an atmosphere, which the Clifton residents, whose houses are connected with the sewer, are liable to do. A Medical Officer of Health would have taken early cognizance of such a sanitary misadventure. The effect of sewer gases on the health of those exposed to their effluvia has been fully treated of, and decisively affirmed by Dr. Parkes in his Practical Hygiene, pp. 107-112.

Paper read at the Meeting of the National Association for the Promotion of Social Science at Bristol, September, 1869.

I wish to be allowed to say a few words on the subject of the Sewerage of Clifton.

Clifton is described by William Kay, M.D., Senior Physician to the Clifton Dispensary, in the Second Report of the Commissioners of Inquiry of 1845, as follows:—"Clifton is naturally divided " into Upper and Lower—the difference of elevation being about 220 feet. There are few " places, probably, which within the same area " present differences, physical and local, more " marked than those occurring in the two divisions. The Upper Clifton, properly so called, " may be said to be on the brow of a hill, in a " convex or semi-circular form, abutting on the " extreme right, the south-west, over the river " Avon, and extending round to the south-east, " nearest to the city of Bristol, comprising a " distance of about a mile.

" Immediately in front lies Lower Clifton, and " the floating harbour of Bristol, opening to the

" right, upon the river Avon. The greater part
" of Clifton, occupying the brow of the hill, is
" sheltered from the north and north-westerly
" winds by the acclivity of the higher ground,
" which rises behind it to the Clifton and Durd-
" ham Downs. These downs, extending about
" two miles, are bounded on the west by the deep
" valley through which the Avon flows, and are
" open to the breezes from the Atlantic and the
" British Channel. The front of Clifton thus
" faces the south and south-west."

Since the year 1845, Clifton, as may be seen by comparing the maps of this day with the map accompanying the Report of 1845, has enlarged itself greatly. It now extends from Clifton Road, Clifton Down, over what were then, and indeed were until lately, green fields, as far as Redland and White Ladies' Road, and is at the present time undergoing a still more rapid extension, and spreading itself over the intervening spaces. Taking 311 feet, the elevation given in the map for the observatory (so called), the height of the highest part of Upper Clifton, adjoining the Durdham Down, cannot now be less than 300 feet above the bed of the river, and the upper part of Redland stands still higher.

The account of the Sewerage of Upper Clifton given in the Ninth Report of the Medical Officer of the Privy Council runs thus:—" The first main
"Sewer constructed was the high level Sewer of
"Clifton, discharging into the Avon at low water
"mark, at Black Rock quarries by an out-

"fall 5 by 4½ feet in diameter. This Sewer has "various gradients, from a steepest of one in 6 to "the least of one in 300. Its depth below the "surface is 10·70 feet, and its branches are 10·12 "feet down. *It is not ventilated nor flushed, and "is stated to require neither the one nor the other "as there is no deposit in it, and never any accumu-"lation of foul gases.* Every inlet to street and "houses is trapped, and only one air exit exists to "allow for wind driving up the sewer in certain "low tides. Every house in its district is now "connected (usually by 9-inch pipes with a fall of "1 in 60) with this sewer, where before there "were universally cesspools. This high level "Clifton Sewer was completed in 1856."

The Clifton Sewerage system is distinct from that of Bristol. It comprehends ten branches uniting in a main sewer which discharges down a steep incline, about 240 feet above the bed of the river, into the Avon, at the foot of Clifton Down, where it mixes with the contents of the great Bristol sewer received from the outfall into the river higher up. The Journal of Science for October 1866, in its comments on the sanitary aspect of Bristol, some of which are not very flattering, animadverts on the commingling of these tides of Sewage in the bed of the Avon, so near the town, as an engineering mistake, and a breach of hygienic laws.

It is not, however, with this matter that I wish to deal, but with the peculiar conditions of the Clifton Sewerage. A principal authority on

Sewerage, Robert Rawlinson, Esq., C.B., states in his remarks as Chairman on the evidence in the First Report of the Commissioners on the river Thames, p. 201, "that it is much more difficult to "sewer safely a place with steep gradients, than it "is to sewer a place that is much flatter, and that "if great care is not taken to pass off the gases "arising from decomposition, the best houses in "the higher parts may be in a worse condition "than if there were no sewers at all." He adds, "that traps in house drains and in sewers, if the "system of drainage depends upon them, are a "delusion and a snare. There are no known "means of keeping them in order, and therefore "they ought not to be depended upon. When "water has absorbed its full charge of gas, it "passes it off again, so that water is no longer a "barrier to the gas." The same authority observes, "if there is an intervening range of houses, and "a drain from them passes uninterruptedly from "the Sewer into each house, you make the house "itself in such weather as this (December), with "an external temperature of 33° or 34°, and an "internal temperature of 60° or 70°, an exhausting pump, drawing in air from any point you "can get it, and if it does not obtain pure air "freely, it will get it from the Sewer and the drain."

It is not too much to affirm that the several conditions described by Mr. Rawlinson present themselves in the unventilated sewers of Upper Clifton. I speak for myself alone, and I cannot do better than follow the example set by Dr.

Carpenter, of Croydon, in stating my own case. I wish I could impart to it some of the graphic force of his narrative. Fortunately, as yet, the unhealthy element which developed itself in his household, has been wanting in mine.

Very shortly after my occupation in November last of my present residence, which is situated nearly at the top of one branch of the Clifton Sewerage system, I was startled by an irruption of sewer gases which permeated the house with their faint sickly odour, and made themselves particularly perceptible when the kitchen range was heated. New houses, however respectable the builder may be, are not famous for the complete arrangement of their traps and ejects. I find the same remark in the evidence already referred to, as applicable to the newer houses in the higher parts of another town near the metropolis. Fortunately, thanks to the builder and the Local Board, the extraordinary neglect sometimes practised, as reported by Mr. Rawlinson in the Sessional Proceedings of your Society of the 25th February last, of builders running their drains into the street, and leaving them there, is unknown here. On the contrary, great care has been bestowed on the connection between the house drains and the district sewer. But the odours from the Sewer which, as Don Quixote told Sancho Panza of himself, "verily smelt and not of ambergris," had to be combated, and as an outside trap was neither desirable nor practicable, double ejects and other approved contrivances were had recourse to. One great principle which has been clearly established by the Croydon experiences. had to be considered, viz., the importance of some through ventilation. Give sewer gases some vent outwards, and they pass away innocuously. Confine them in the sewer and house drains, and they become poisonous, the irrepressible carriers of what may prove the seeds of active diseases into the heart of the dwellings. This rule is the more necessary to be observed from the circumstance that every office usually left, elsewhere, outside, has been here packed inside. This object was attempted to be effected by a ventilating 1½ inch pipe, connected with the higher end of the house drain, but after a time I found that it was doing its work too well. In other words I found that although the end was 45 yards from the sewer, I was ventilating the sewer itself, an expedient of house sanitation to which my neighbours might reasonably object, and direct communication between the pipe and the drain has since been cut off. I may add that on uncovering the top of the drain in order to effect these alterations, the upward rush of the updraught was like the blast from a steam bellows. The fact of the upward pressure of the gases in the sewer itself may be witnessed by any one who cares to look into the road-side gratings. He will there see the gas bubbles forcing themselves up through the superincumbent material of the street traps in the liveliest manner. It is not always that the pressure will be upwards. At other times the downward rush will transfer the gases to the mouth of the sewer at its outfall, in correspondence with the external temperature. In a sewer of steep gradients there cannot be an equilibrium.

These facts and considerations induce a reasonable doubt whether the official statement already cited "that the Clifton Sewers do not require ventilation nor flushing, as there is no deposit in them, and never any accumulation of foul gases," will bear the test of inquiry. We are told on excellent authority,* in the Sessional proceedings of your Society of the 10th of June last, that in all brick drains the brick-work becomes necessarily saturated, and keeps up a supply of a highly decomposable matter which inevitably gives off offensive effluvia, and that it is a fallacy to suppose that no effluvia are disengaged from sewers without the presence of a deposit of solid matter. A sewer needing neither ventilation nor flushing must be indeed a *rara avis* in civil engineering. It would be far better to follow Dr. Carpenter's advice, and untrap every opening in the roads, than to leave things as they are. There might be occasional offence to the organs of smell in one case. There is danger to health in the other.

Individuals can fight their own battle in these things, but the arguments in favour of ventilation which may be urged on behalf of Upper Clifton, apply with tenfold force to the similarly-located and crowded hive of Redland which is united with us by the same Sewerage system. There the order of things is reversed, and the poorer population of the Quarry and its neighbourhood, instead of being in their usual, and in this respect safer position, at the lower level of the Sewer system, are at the top of it. Their grating openings have been carefully trapped, but the pent-up gases are ever struggling to escape, and there can be no security against their diffusion at any time amongst the Quarry hovels. I have watched their effort to free themselves, like the genii in the Arabian nights, from their prisons, and the thought that traps had been generally declared by competent authorities to be a delusion and a snare, was not calculated to assure one for the inhabitants. The worst parts of Redland formerly got rid of their sewage by discharging it into cracks in the limestone, as an offering to the gnomes below. What the gnomes thought of it, whether it ever penetrated deep into the hard mountain mass, or whether there was anything, besides the gnomes, to be affected by the offering, I cannot tell; but I cannot help thinking that the tenderers of it, in parting with it once for all, in this unceremonious manner, were better off than they now are.

---

* Mr. Arthur Jacob, C.E.

At present the Redland Quarry District, owing chiefly to its badly located, crowded, and unventilated dwellings, and the sewer air diffused among some of them, constitutes a grievous blot on the sanitary map of Bristol, and its neighbourhood, in spite of a fair supply of drinking water, and the natural advantages of its elevated position. It is said, on good authority, to have become the annual haunt of epidemic disease, and much of the medical work there is said to consist in trying to palliate the effects of foul air among the poorer inhabitants. In short with so many fertile seeds of sanitary disturbance close to them, the health of the Redland Quarry appears to merit more attention from the residents of Upper Clifton than it has yet received.

It is not, I believe, the wish of this Association, or of those who attend it, that it should meet only to read papers and exchange compliments, but that some solid result should follow on their gatherings. In the hope that it may do so in this instance I have brought the subject forward. The Bristol and Clifton Water Works' Company have done great things in supplying the highest levels with untainted water, if they would only complete their favours by covering in their service reservoirs. The Local Board, too, have done great things, and their exertions, and those of their "Medical Inspector," so designated "from some "timorous reason of policy,"* have borne honourable fruit already to the sanitary cause, and will, no doubt, bear more hereafter, if they would but have the obscurity which hangs over their death-rate cleared up. I firmly believe, and I must claim to exercise my right to act on that belief, here as elsewhere, that public representations on matters bearing directly on the public health are of essential service to every public body, and that the most dangerous condition for any community to be placed in is to have "peace, peace" cried, when there is no peace. That body, Sir, can well bear individual criticism, such as has now been ventured on, and I have the less hesitation in attempting it, as it will be in your power, from your long and well-known connection with Clifton,[†] to set me at once right, if in any matter or statement I have been wrong.

---

* See 9th Report of Medical Officer of Privy Council, p. 64.

S. SNEADE BROWN.

WINIFRED HOUSE,
PEMBROKE ROAD,
September, 1869.

[†] J. A. Symonds, M.D., F.R.S.E.

APPENDIX.*

Whilst on the subject of the Redland Quarry District, I beg leave to describe it briefly. The district has received its local popular name from having been located inside and around an old quarry on the edge of Durdham Down. It is described in the Report on the Sanitary Condition of Clifton, by W. Kay, M.D., in the Second Report of the Commissioners of Inquiry for the year 1845, as "that portion of Durdham Down "which adjoins Redland, having a population of "950 or 1,000 persons, consisting chiefly of "labourers, limeburners, mechanics, and small "shopkeepers." It is comprised between White Ladies' Road and the south-west edge of the Down. A district thus formed by the chance aggregation, in the first instance, of the rudest portion of the labouring community, and of those who ministered to their wants, and were located where sanitary considerations were not likely to be thought of, might be expected to exhibit, in process of time, very serious sanitary defects, and so the event has proved. Besides the very great drawbacks to healthiness consequent on the locality, the great increase of building operations in the neighbourhood has led, of late years, to a corresponding demand for labour of all kinds, and no building land being available for the extension of the accommodation, the increased population has been crowded down on the old inhabitants. Houses for the better classes have been run along the brow of the Down above them, shutting them off from the currents of air from the prevalent quarter, and the advantages of its 300 feet elevation in respect to purity and circulation of air, have been otherwise neutralized by the position of the poorer tenements. Of these some are backed by the sides of the old quarry, and are entirely deprived of through ventilation, and others stand inside the quarry excavation, and are overtopped on all sides by houses. With regard to the privy arrangements of Bristol generally, we are told in the Report of Dr. Buchanan, in the Ninth Report of the Medical Officer of the Privy Council, that outside privies are connected with sewers by means of a shoot and eject, but are not supplied with water service, and the plan is commended as preferable to the earthenware pan and trap, "in "the rough use of which by careless folks so much "difficulty is experienced in other towns;" but however well suited to the lower levels of a Sewerage system, it has its peculiar dangers and disadvantages in the uppermost parts, arising from the pressure and emission of sewer gases, particularly when, as in the case in the Quarry District, the privies are in immediate contiguity to the doors, and in some instances *inside* the narrow and confined dwellings themselves. As long as there is water in the eject, there is such protection from the ascending gases as a thin film of it can afford, but what dependence can be placed on the poor and shifting inhabitants to keep their ejects in order? With regard to the physical consequences of living in such an atmosphere, Dr. Southwood Smith, a name to be held in all honour, told us thirty years ago. "When fever "once breaks out and becomes prevalent under "circumstances of ill-ventilation and over-crowding, the poison acquires a virulence which not "only proves unusually mortal to the persons "immediately attacked, and to those who attend "the sick, but the evil is frightfully increased by "the extension of the infection to neighbouring houses and districts. The room of a "fever patient, in a small and heated apartment, "with no perflation of fresh air, is perfectly analogous to a standing pool in Ethiopia full of the "bodies of dead locusts. The poison generated in "both cases is the same; the difference is merely in "the degree of its potency. Nature, with her "burning sun, her stilled and pent-up wind, her "stagnant and teeming marsh, manufactures "plague on a large and fearful scale. Poverty "in her hut, covered with her rags, surrounded "with her filth, striving with all her might "to keep out the pure air and to increase the "heat, imitates nature too successfully; the "process and the product are the same; the only "difference is in the magnitude of the result."*

---

* Omitted from the Paper read at the Meeting of the Association from want of time.

---

* Fourth Report of Poor Law Commissioners, 1838. We are told by Mr. Simon in his Report to the General Board of Health of the year 1858 (page 18 note), that it was on this, and other Reports of the same authority, that the superstructure of the subsequent sanitary legislation was chiefly based.

What then must be the consequence, when sewer gases contribute their malaria to the noxious atmospheric compost? I have it on good authority that these cottages have always been a haunt of disease. My informant states, "You could not "wonder at it, had you been obliged (as I have "often been) to visit patients there after the "houses had been closed three or four hours after "bed-time. Every one of the children living in "that cottage (naming a particular one) are eaten "up with *scrofula*—clearly a case of blood-"poisoning from the constant inhalation of foul "air. Ever since I have known the locality "and people, now for the last sixteen years, we "have never been without fever, more or less, "every autumn. Their redress from their land-"lord is, 'if you don't like it, leave it—there are "hundreds waiting for it, or anything else which "comes under the name of a house.'" The rent of these places varies from 2s. to 4s. a week. In the evidence taken by the Commissioners on the River Thames (First Report, p. 209), Dr. Maybury of Richmond, points out how the parish money is continually absorbed by the occupants of bad tenements, so that the parish pays directly for the support of the very property which produces this sickness and necessity for relief, and things thus keep moving perpetually in a vicious circle, all which might be prevented if the owners of that property did their duty, and the local authorities did theirs, so far as their legal powers extended, to put an end to such a state of things, by compelling obedience to proper sanitary regulations.

There are several houses, or rather hovels, in the Quarry region which, from the simple facts of the absence of all back ventilation, and the existence of the privy shoots *inside*, appear structurally unfit for human habitation, and as such to come within the scope of the new "Artizans and Labourers' Dwelling Act of 1868." There has not yet been any judicial interpretation of that act, but in a discussion on it at a Meeting of the Metropolitan Association of Medical Officers of Health in 1869, Dr. Liddle observed that "the Act applied "to the houses of densely populated places, and "those which were structurally unhealthy and incapable of being improved. It was not easy to "define the class of house to be pulled down "under this Act, but he should say those where no "ventilation at back existed, where the rooms were "less than seven feet high, of old construction, "old bricks, the staircase dark and filthy, cellars "below the level, privy in the back, and the class "of house with no backyard, or courts ending in "a *cul de sac*, were bad."—*Public Health Journal, March*, 1869.

S. SNEADE BROWN.

b.SH

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE
LIBRARY
- SEP 1962

LONDON:
PRINTED BY KERBY & ENDEÀN, 190, OXFORD STREET, W.

VMM